

Appendix G. Value of the Haber's Law Exponent (n) for various gases and vapors for acute RELs developed using OEHHA (1999) procedures

TABLE G1. VALUE OF THE HABER'S LAW EXPONENT (*n*) FOR VARIOUS GASES AND VAPORS FOR ACUTE RELS¹

Chemical	<i>n</i>	Species/Effect (site of action)	References, Comments
Acrolein	1.2	rat/lethality (local irritant)	U.S. EPA (1992a; U.S.EPA, 1992b) ²
Acrylonitrile	1.1	rat/lethality (systemic)	(Dudley and Neal, 1942; Appel et al., 1981) ³
Allyl chloride	0.5	rat/lethality (local irritant)	Adams <i>et al.</i> (1940) ²
Ammonia	4.6	Human/irritation	Rosenbaum <i>et al.</i> (1993)
	2.02	rat/lethality (local irritant)	Appelman <i>et al.</i> (1982)
Arsine	2.2	rat/lethality (systemic)	IRDC (1985) ² for 0.5 to 1 hr (n dependent on exposure duration)
	1.0	rat/lethality (systemic)	IRDC (1985) ² for 4 hr to 1 hr (n dependent on exposure duration)
	2	mice/lethality (systemic)	Levvy (1947)
Benzene	2	not given	AICE (1989)
Bromine	2.2	mice/lethality (local irritant)	Bitron & Aharoson (1978) ³
Carbon monoxide	1	not given	AICE (1989)
Carbon tetrachloride	2.8	rat/lethality (systemic)	Adams <i>et al.</i> (1952) ³
Chlorine	2.8	rat/lethality (local irritant)	Zwart & Woutersen (1988) ² for 0.5 hr to 1 hr (n dependent on exposure duration)
	1.0	rat/lethality (local irritant)	Zwart & Woutersen (1988) ² for 4 hr to 1 hr (n dependent on exposure duration)
	1.3	mouse/lethality (local irritant)	Zwart & Woutersen (1988) ²
	3.5	mouse/lethality (local irritant)	Bitron & Aharoson (1978) ³
Chlorine pentafluoride	2	rat, mouse, dog, monkey/lethality (local irritant)	Darmer <i>et al.</i> (1972) ³
Crotonaldehyde	1.2	rat/lethality (local irritant)	Rinehart (1967) ³
Dibutyl hexamethylene-diamine	1	rat/lethality (local irritant)	Kennedy & Chen (1984) ³
1,2-dichloro-ethylene	2	(not applicable)/lethality (systemic)	U.S.EPA (1996), based on the mid-point range of n values from lethality data of ³
Dimethyldichloro-silane	2	(not applicable)/lethality (local irritant)	U.S.EPA (1996), based on the mid-point range of n values from lethality data of ³
Ethylene dibromide	1.2	rat/lethality (systemic)	(Rowe <i>et al.</i> , 1952b) ³
Ethylene imine	1.1	rat, guinea pig/lethality (local irritant)	(Carpenter <i>et al.</i> , 1948) ³
Fluorine	1.9	rat/lethality (local irritant)	U.S.EPA (1996), derived from LC ₅₀ data of Keplinger & Suisse (1968)
	1.8	mouse/lethality (local irritant)	U.S. EPA (1996), derived from LC ₅₀ data of Keplinger & Suisse (1968)
	1.6	guinea pig/lethality (local irritant)	U.S.EPA (1996), derived from LC ₅₀ data of Keplinger & Suisse 1968)
Formaldehyde	2	not given	AICE (1989)

Chemical	n	Species/Effect (site of action)	References, Comments
Hydrazine	2	(not applicable)/lethality (systemic)	U.S.EPA (1996), based on the mid-point range of n values from lethality data of ³
Hydrogen chloride	1	rat, mouse/lethality (local irritant)	Darmer (1972) ³
	1.5	rat/lethality (local irritant)	Hartzell & Johnson (1985) ²
Hydrogen cyanide	2.7	numerous species/lethality (systemic)	Barcroft (1931) ³
Hydrogen fluoride	2	rabbits, guinea pigs/ lethality (local irritant)	Machle (1934) ³
Hydrogen fluoride (low humidity)	1	rat/lethality (local irritant)	Haskell Lab. (1988) ²
Hydrogen sulfide	2.2	cat, rabbit/lethality (systemic/local irritant)	Lehmann (1892) ³
	8.2	lethality (systemic/local irritant)	Arts (1989)
Methyl bromide	4.0	severe morbidity (systemic/local irritant)	Pharmaco: LSR, (1994) as cited in DPR (2004) ² , DPR (1996)
	1	not given	AICE (1989)
Methylene chloro-bromide	1.6	rat/lethality (systemic)	Torkelson (1960) ³
Methyl hydrazine	1.0	squirrel monkey/lethality (systemic and local irritant)	Haun (1970) ²
	1.0	dog/lethality (systemic and local irritant)	Haun (1970) ²
Methyl isocyanate	1.1	human/eye irritation	Mellon Institute (1963) ²
	0.5	rat/lethality (local irritant)	Kimmerle & Eben (1964) ²
	0.7	rat/lethality (local irritant)	DOW Chemical (1990) ²
Methyl mercaptan	2	(Not applicable)/lethality (systemic and local irritant)	U.S.EPA (1996), based on the mid-point range of n values from lethality data of ³
Methyl t-butyl ether	2.0	lethality (systemic)	Snam Progretti (1980) as cited in ten Berge et al., (1986) ³
Nitrogen dioxide	3.5	guinea pig, mouse, dog, rat, rabbit/lethality (local irritant)	Hine et al., (1970) ³
Nitric acid	3.5	not applicable (local irritant)	U.S.EPA (1996), based on NO ₂ from Hine et al. (1970)
Perfluoroisobutylene	1.2	rat/lethality (local irritant)	Smith et al. (1982) ³
Phosgene	1	lethality (local irritant)	Rinehart & Hatch (1964)
Propylene oxide	2.2	rat/lethality (local irritant)	Rowe et al. (1956) ²
	1.5	guinea pig/lethality (local irritant)	Rowe et al. (1956) ²
Sulfur dioxide	1	not given	AICE (1989)
Tetrachloroethylene	2.0	rat/lethality (systemic)	Rowe et al (1952a) ³
Toluene	2.5	not given	AICE (1989)
Trichloroethylene	0.8	rat/lethality (systemic)	Adams et al. (1951) ³

¹ developed using procedures specified in OEHHA (1999a). ²derived by OEHHA.³derived by ten Berge (1986).

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